WHAT IS CLAIMED IS:

1. A high frequency line-to-waveguide converter comprising:

a high frequency line including a dielectric layer, a line conductor disposed on one surface of the dielectric layer, and a ground conductor layer disposed on the same surface so as to surround one end of the line conductor;

a slot formed in the ground conductor layer so as to be substantially orthogonal to the one end of the line conductor and coupled to the high frequency line;

a shield conductor part disposed on a side of or in an inside of the dielectric layer so as to surround the one end of the line conductor and the slot; and

a waveguide disposed on a side of the other surface of the dielectric layer so that an opening is opposite to the one end of the line conductor and the slot, and electrically connected to the shield conductor part.

2. The high frequency line-to-waveguide converter of claim 1, wherein the shield conductor part includes a plurality of shield through conductors disposed in the inside of the dielectric layer.

3. The high frequency line-to-waveguide converter of claim 1, wherein a thickness of the dielectric layer is

approximately (2n - 1)/4 (n is a natural number) of a wavelength of a signal transmitted through the high frequency line.

4. The high frequency line-to-waveguide converter of claim 1, wherein a tip of the one end of the line conductor is opened, and a distance between the tip and the slot is approximately (2n - 1)/4 (n is a natural number) of the wavelength of the signal transmitted through the high frequency line.

5. The high frequency line-to waveguide converter of claim 1, wherein a tip of the one end of the line conductor is short-circuited to the ground conductor layer, and a distance between the tip and the slot is approximately (n - 1)/2 (n is a natural number) of the wavelength of the signal transmitted through the high frequency line.

6. The high frequency line-to-waveguide converter of claim 1, further comprising:

a second dielectric layer laminated on the dielectric layer on which the line conductor is disposed; and

one surface ground conductor layer provided on one surface of the second dielectric layer,

whereby the high frequency line is constructed as a coplanar line structure having a ground.

7. A high frequency line to waveguide converter comprising:

a high frequency line including a dielectric layer, a line conductor disposed on one surface of the dielectric layer, and a same surface ground conductor layer disposed on the same surface so as to surround one end of the line conductor;

a slot formed in the same surface ground conductor layer so as to be substantially orthogonal to the one end of the line conductor and coupled to the high frequency line in terms of high frequency;

a shield conductor part disposed on a side of or in an inside of the dielectric layer so as to surround the one end of the line conductor and the slot;

a waveguide disposed on a side of the other surface of the dielectric layer so that an opening is opposite to the one end of the line conductor and the slot, and electrically connected to the shield conductor part; and

an internal ground conductor layer disposed in the inside of the dielectric layer between the same surface ground conductor layer and the waveguide and having a transmission opening for causing an electromagnetic wave of

a signal transmitted through the high frequency line to be transmitted between the slot and the waveguide.

8. The high frequency line-to-waveguide converter of claim 7, wherein a distance between the internal ground conductor layer and the opening of the waveguide is approximately (2n - 1)/4 (n is a natural number) of a wavelength of an electromagnetic wave of a signal transmitted through the high frequency line.

9. The high frequency line-to-waveguide converter of claim 7, wherein an area of the transmission opening is half or less of an area of a region surrounded by the shield conductor part.

10. The high frequency line-to-waveguide converter of claim 7, wherein the shield conductor part includes a plurality of shield through conductors disposed in the inside of the dielectric layer.

11. The high frequency line-to-waveguide converter of claim 7, wherein a tip of the one end of the line conductor is opened, and a distance between the tip and the slot is approximately (2n - 1)/4 (n is a natural number) of the wavelength of the signal transmitted through the high

frequency line.

12. The high frequency line-to-waveguide converter of claim 7, wherein a tip of the one end part of the line conductor is short-circuited to the same surface ground conductor layer, and the distance between the tip and the slot is approximately (n - 1)/2 (n is a natural number) of the wavelength of the signal transmitted through the high frequency line.

13. The high frequency line-to-waveguide converter of claim 7, wherein the same surface ground conductor layer and the internal ground conductor layer are connected by a connection conductor disposed to pass through the dielectric layer along the transmission opening.

14. The high frequency line-to-waveguide converter of claim 7, further comprising:

a second dielectric layer laminated on the dielectric layer on which the line conductor is disposed; and

one surface ground conductor layer provided on one surface of the second dielectric layer,

whereby the high frequency line is constructed as a coplanar line structure having a ground.

15. A high frequency package comprising:

a metal base a metal base having a mounting part of a high frequency electronic component on one surface, and a through hole disposed to be adjacent to the mounting part, an opening on one side of the through hole being connected with a waveguide; and

a high frequency line-to-waveguide conversion substrate joined on an opening on another side of the through hole, the high frequency line-to-waveguide conversion substrate including:

a high frequency line including:

a dielectric substrate;

a high frequency line conductor directed from an outer peripheral part to a center part on one surface of the dielectric substrate; and

a same surface ground conductor disposed on the same surface as the one surface of the dielectric substrate so as to surround an end of the high frequency line conductor on the center part side,

a frame ground conductor formed on another surface of the dielectric substrate in a shape conforming to an opening on another side of the through hole so as to be opposite to the end of the high frequency line conductor on the center part side;

a slot provided on the same surface ground conductor and formed to be orthogonal to the end of the high frequency line conductor on the center part side and coupled to the high frequency line in terms of high frequency; and

a connection conductor for connecting the same surface ground conductor and the frame ground conductors,

wherein the high frequency line to waveguide conversion substrate is joined on the other side of the through hole such that the high frequency line is positioned on a side of the mounting part and the frame ground conductor is made to conform to the opening on the other side of the through hole.

16. The high frequency package of claim 15, wherein an interval between the high frequency line conductor and the same surface ground conductor is 1/4 or less of a signal wavelength of a high frequency signal transmitted through the high frequency line.

17. A high frequency package comprising:

a metal base a metal base having a mounting part of a high frequency electronic component on one surface, and a through hole disposed to be adjacent to the mounting part, an opening on one side of the through hole being connected

with a waveguide; and

a high frequency line-to-waveguide conversion substrate joined on an opening on another side of the through hole, the high frequency line-to-waveguide conversion substrate including:

a high frequency line including:

a dielectric substrate;

a high frequency line conductor directed from an outer peripheral part to a center part on one surface of a dielectric substrate; and

a same surface ground conductor disposed on the same surface as the one surface of the dielectric substrate so as to surround an end of the high frequency line conductor on the center part side,

a frame ground conductor formed on another surface of the dielectric substrate in a shape conforming to an opening on another side of the through hole so as to be opposite to the end of the high frequency line conductor on the center part side;

a slot provided on the same surface ground conductor and formed to be orthogonal to the end of the high frequency line conductor on the center part side and coupled to the high frequency line in terms of high frequency;

a internal ground conductor formed between the high

frequency line conductor of an inside of the dielectric substrate and the frame ground conductor, and provided with the transmission opening opposite to the slot and larger than the slot;

a first connection conductor for connecting the same surface ground conductor and internal ground conductor; and

a second connection conductor for connecting the frame ground conductor and the internal ground conductor,

wherein the high frequency line-to-waveguide conversion substrate is jointed on the other side of the through hole such that the high frequency line is positioned on a side of the mounting part and the frame ground conductor is made to conform to the opening on the other side of the through hole.

18. The high frequency package of claim 17, wherein an interval between the high frequency line conductor and the same surface ground conductor is 1/4 or less of a signal wavelength of a high frequency signal transmitted through the high frequency line.

19. A high frequency package comprising:

a metal base including a mounting part for a high frequency electric component on one surface thereof, a through hole disposed to be adjacent to the mounting part

and having an opening on one side connected with the waveguide, being formed therein; and

a conversion substrate, including:

a high frequency line including:

a dielectric substrate;

a high frequency line conductor formed on one surface of the dielectric substrate and disposed so as to extend from an outer peripheral part toward a center part on the one surface of the dielectric substrate; and

a same surface ground conductor disposed on the same surface as the one surface of the dielectric substrate so as to surround an end of the high frequency line conductor on the center part side,

a frame ground conductor formed on another surface of the dielectric substrate in a shape conforming to an opening on another side of the through hole so as to be opposite to the end of the high frequency line conductor on the center part side;

a slot provided on the same surface ground conductor and formed to be orthogonal to the end of the high frequency line conductor on the center part side and coupled with the high frequency line conductor in terms of high frequency; and

a connection conductor for connecting the same surface ground conductor and the frame ground conductors,

wherein th conv rsion substrate is joined on the other side of the through hole of the metal base such that the high frequency line is positioned on the side of the mounting part of the metal base and the frame ground conductor is made to conform to the opening on the other side of the through hole of the metal base.

20. A high frequency package comprising:

a metal base including a mounting part for high a frequency electric component at one surface thereof, the through hole disposed to be adjacent to the mounting part and having an opening on one side thereof connected with the waveguide, being formed therein; and

a conversion substrate including:

a high frequency line including:

a dielectric substrate;

a high frequency line conductor disposed so as to extend from an outer peripheral part toward a center part on one surface of the dielectric substrate; and

a same surface ground conductor disposed on the same surface as the one surface of the dielectric substrate so as to surround an end of the high frequency line conductor on the center part side,

a frame ground conductor formed on another surface of the dielectric substrate in a shape conforming to an

opening on another side of the through hole so as to be opposite to the end of the high frequency line conductor on the center part side;

a slot provided on the same surface ground conductor and formed to be orthogonal to the end of the high frequency line conductor on the center part side and coupled with the high frequency line conductor in terms of high frequency;

a internal ground conductor formed between the high frequency line conductor of an inside of the dielectric substrate and the frame ground conductor, and provided with the transmission opening opposite to the slot and larger than the slot;

a first connection conductor for connecting the same surface ground conductor and internal ground conductor; and

a second connection conductor for connecting the frame ground conductor and the internal ground conductor,

wherein the conversion substrate is joined on the other side of the through hole of the metal base such that the high frequency line is positioned on the side of the mounting part of the metal base and the frame ground conductor is made to conform to the opening on the other side of the through hole of the metal base.